Zero-order Diabatic Potentials Defined in VCH-FIT

Potentials are defined by the frequency, ω, and a set of "expansion coefficents", $k_1, k_2, \ldots$

Quartic	$\frac{1}{2}\omega^2 Q^2 + k_1 Q + \frac{1}{2}k_2 Q^2 + \frac{1}{24}k_3 Q^4$
Morse	$D_0 \left[\exp(\alpha(Q - Q_0) - 1)\right]^2 + E_0$ with $D_0 = k_1$ $\alpha = \sqrt{\frac{\omega + k_2}{2D_0}}$ $Q_0 = k_3$ $E_0 = -D_0 \left[\exp(\alpha Q_0 - 1)\right]^2$
Anti-Morse	$D_0 \left[\exp(-\alpha(Q - Q_0) - 1)\right]^2 + E_0$ with $D_0 = k_1$ $\alpha = \sqrt{\frac{\omega + k_2}{2D_0}}$ $Q_0 = k_3$ $E_0 = -D_0 \left[\exp(\alpha Q_0 - 1)\right]^2$
Exp	$E_\infty \left[\exp\left(-\alpha Q\right) - 1\right]$ with $E_\infty = k_1$ $\alpha = k_2$
Avoided_crossing	$\frac{1}{2}\left\{\nu_b + \nu_d - \sqrt{\left(\nu_b - \nu_d\right)^2 + 4\lambda^2}\right\}$ with $\nu_b = D_b \left[1 - \exp(-\alpha_b(Q - Q_{0b}))\right]^2$ $\nu_d = A\exp(-\alpha_d(Q - Q_{0d})) + D_d$ $D_b = k_1$ $\alpha_b = k_2$ $Q_{0b} = k_3$ $A = k_4$ $\alpha_d = k_5$ $Q_{0d} = k_6$ $D_d = k_7$ $\lambda = k_8$
General_morse	$D_0 \left[1 - \exp(-\alpha(Q - Q_0))\right]^2 + E0$ with $E0 = -D_0 \left[1 - \exp(\alpha Q_0)\right]^2$ $D_0 = k_1$ $\alpha = k_2$

	$Q_0 = k_3$
Morse_lorentzian	$D_0\left[1-\exp(-\alpha(Q-Q_0))\right]^2 + E_0 + \left[\frac{\delta}{1+(Q-\epsilon)^2/\phi}\right]$ with $D_0 = k_1$ $\alpha = k_2$ $Q_0 = k_3$ $E_0 = k_4$ $\delta = k_5$ $\epsilon = k_6$ $\phi = k_7$
Morse_gaussian	$D_0\left[1-\exp(-\alpha(Q-Q_0))\right]^2 + E_0 + \delta\exp(-\epsilon(Q-\phi)^2)$ with $D_0 = k_1$ $\alpha = k_2$ $Q_0 = k_3$ $E_0 = k_4$ $\delta = k_5$ $\epsilon = k_6$ $\phi = k_7$
Avoided_crossing2	$\frac{1}{2}\left\{\nu_b+\nu_d-\sqrt{(\nu_b-\nu_d)^2+4\left[\alpha\tanh(\beta Q)\right]^2}\right\}$ with $\nu_b = D_b\left[1-\exp(-\alpha_b(Q-Q_{0b}))\right]^2$ $\nu_d = A\exp(-\alpha_d(Q-Q_{0d}))+D_d$ $D_b = k_1$ $\alpha_b = k_2$ $Q_{0b} = k_3$ $A = k_4$ $\alpha_d = k_5$ $Q_{0d} = k_6$ $D_d = k_7$ $\alpha = k_8$ $\beta = k_9$
Avoided_crossing_quartic	$\frac{1}{2}\left\{\nu_l+\nu_u-\sqrt{(\nu_l-\nu_u)^2+4(\lambda Q)^2}\right\}$ with $\nu_l = \frac{1}{2}\omega^2Q^2+\frac{1}{2}\gamma_l Q^2+\frac{1}{24}\epsilon_l Q^4$ $\nu_u = \frac{1}{2}\omega^2Q^2+\frac{1}{2}\gamma_u Q^2+\frac{1}{24}\epsilon_u Q^4+\Delta E$ $\gamma_l = k_1$ $\epsilon_l = k_2$ $\gamma_u = k_3$

	$\epsilon_u = k_4$ $\lambda = k_5$ $\Delta E = k_6$